ment of the Hellenic culture in Ionia. The Hittites were predominant in Asia Minor from 2000 B.C. to 800 B.C., and, besides being possessed of a highly developed culture of their own, acted as intermediaries for the transmission of Mesopotamian culture to the Greeks. Of both these influences there is distinct evidence in the few excavations that have been carried out in Asiatic Greece.

There appears to be a rich field awaiting the archæological excavator both in Ionia and in other parts of Asia Minor. In Lydia, which was apparently a Hittite satrapy, very little excavation has been done, and in the Hittite country on the upper Euphrates hundreds of buried cities are known to exist, in some of which, it is almost certain, as Mr. Hogarth points out, bilingual inscriptions connecting the Hittite script with the Assyrian will be found. We may, then, expect discoveries equalling, if not excelling, in importance those that have recently been made in Mesopotamia, in Egypt, and in Crete.

Another iconoclastic view of Mr. Hogarth's is that the Phœnicians played an insignificant part in the development of Greek civilisation. He reduces "the part played by the Phœnicians among the Greek Isles and coasts to that of mere huckstering traders who followed seaways long ago opened by others."

Mr. Hogarth considers that the Hittites were not a maritime people, but were confined strictly to their continent by the Ægean command of the sea. In view of the migration from Lydia to Umbria related by Herodotus, and of the existing population of broad-headed races in the Balkans, which, judging from its present distribution, must apparently have landed on the eastern shores of the Adriatic, Mr. Hogarth's views on the non-maritime character of the Hittites will, we venture to think, be considerably modified by future discoveries. The one weak point in Mr. Hogarth's admirable little book is his disregard of the evidence of physical anthropology. No explanation of the ethnological evolution of the East will be satisfactory which fails to account for the transition of the primitive dolichocephalic peoples of the Balkan peninsula into the strongly brachycephalic population of the present day, and in this respect Mr. Hogarth's otherwise admirable work completely fails. J. G.

SOME NEW CHEMICAL BOOKS.

(1) *Naturgeschichte einer Kerze von Michael Faraday.* Herausgegeben von Dr. R. Meyer. Pp. viii+172. (Leipzig: Quelle und Meyer, 1909.) Price 2.50 marks.

(2) *Junior Chemistry.* By R. H. Adie. Pp. viii+266. (Cambridge: University Tutorial Press, 1909.) Price 2*s.* 6*d.*

(3) *Chemistry.* By Prof. W. A. Tilden, F.R.S. Dent's Scientific Primers. Pp. ix+108. (London: J. M. Dent and Co., n.d.) Price 1*s.* net.

(1) FARADAY'S six lectures on the chemical history of a candle were, it may be remembered, delivered to a juvenile audience at the Royal Institution during the Christmas holidays of 1860–1, nearly half a century ago.

In reading them we are impressed not merely by the delightful simplicity and freshness of their style, and by the variety and ingenuity of the experimental illustrations, but more especially with the completeness of the story he had to tell. There is little that has been modified or extended in this branch of knowledge during these fifty years; there is scarcely a single sentence which might not be uttered without comment or correction to a similar audience to-day.

It is not surprising, therefore, that a fresh edition of Dr. Meyer's excellent German translation should be in demand among young people in Germany, and it speaks well for their appreciation of Faraday and his charming "chemical history" that the translation has reached its fifth edition.

The book is attractively bound, and contains a very pleasing portrait of the author, together with a short biography.

(2) Mr. Adie justifies the production of another elementary chemistry on the ground that the average first-year student shows a lack of intelligent understanding of chemical aims and methods, for which, we infer, the other books are mainly responsible. We are inclined to think that this want of intelligent understanding is due neither to the character of a particular book, nor altogether to the teacher, but to the kind of chemistry done in schools and fostered by the scholarship system of the older universities.

If the systematic study of chemistry at the university or college were founded on a good general knowledge of mechanics and physics, and an elementary notion of those chemical processes applicable to everyday phenomena, the path of the college professor or lecturer would be made much smoother. But schools are not content with this modest programme, and insist upon a standard of knowledge beyond the grasp of the average schoolboy. The result is that the college teacher has to build upon a muddy foundation of confused ideas, which are so familiar to examiners and so difficult to eradicate later. What commends Mr. Adie's new book is not so much the disastrous effects of its predecessors as the long teaching experience of the author. The results of fifteen years' experience of a thoughtful teacher are always valuable, and, as one might have anticipated, the book offers a thoroughly sound course of practical instruction.

The arrangement of the exercises is clear and logical, the examples are thoroughly typical, well selected, well illustrated, and carefully described. Many of the experiments, without being exactly new, are modified and arranged in a convenient form, and the quantitative examples, which are numerous and varied, furnish a sound basis for that most difficult part of chemistry, the understanding of quantitative laws and the theories drawn from them. In reference to the quantitative part, it would be interesting to know what sort of errors the author obtained in determining such things as the gravimetric composition of water, the weight of steam, and the analysis of the oxides of nitrogen, of which no actual examples are given. If the two oxides of nitrogen give anything like correct results by the method described, that much-quoted example of multiple proportion would lose something of its elusive character.

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(3) In the editor's preface to Dent's Scientific Primers, in which the one under review is included, we are told that the great advances in knowledge during the last thirty years necessitate a re-statement of the theories of the different sciences.

This may be true of chemistry if it were a question of publishing a new treatise or even a students' text-book; but when we consider that this miniature volume of a hundred pages is intended for a student possessing no previous acquaintance with the subject and without the leisure to study it systematically, we cannot be surprised that the advances in knowledge are not very apparent. We might even go further and state that, except for a passing reference to radium and the noble gases, and the use of the words "stereochemistry" and "polypeptides," the book might just as well have appeared thirty years ago.

With the very limited space at his disposal, Prof. Tilden has made good use of his materials, and has compressed into a small compass a very readable and suggestive account of the elementary facts and theories of chemistry.

J. B. C.

OUR BOOK SHELF.

Histoire du Développement de la Chimie depuis Lavoisier jusqu'a nos Jours. By Prof. A. Ladenburg. Traduit sur la 4^e^ édition allemande. By Prof. A. Corvisy. Pp. v+388. (Paris: A. Hermann et Fils, 1909.) Price 15 francs.

FORTY years ago, the first German edition of Ladenburg's "Lectures on the History of the Development of Chemistry during the past 100 Years" was published. This was a relatively small book of 320 pages, which presented, in the course of fourteen lectures, a carefully drawn and evenly balanced sketch of the progress of chemistry subsequent to the time of Lavoisier. At the date of its publication it was unique in dealing, in a logical and consistent manner, with the progress of the atomic theory in its application both to inorganic and to organic chemistry, and in serving at least as an introduction to the particularly difficult and complicated period in the history of organic chemistry which began in the 'thirties and extended to the late 'fifties or early 'sixties of last century. It was not until about four years later that this period was dealt with, a good deal more elaborately, by Kopp in his "Development of Chemistry in Recent Times" (1873). A specially valuable feature of Ladenburg's lectures was the abundance of references to the literature, which tended to encourage the reader to extend his knowledge of particular branches of the subject by consulting the original papers of the various authors. A second German edition was called for in 1887, when the original book was revised, and was extended by the addition of a fifteenth lecture.

In 1900 an English version of Ladenburg's "History" was published, which was translated from the second German edition, but included various corrections and minor additions by the author, and also a sixteenth lecture, specially written for this translation. A revised English edition appeared in 1905. The third German edition (1902) was merely a reprint of the second edition with the sixteenth lecture added to it, but in 1907 a thoroughly revised and very considerably enlarged German edition appeared, which extended to more than 400 pages, and contained seventeen lectures, the subject-matter being brought up to date as fully as possible, and including accounts of the progress of discovery in connection with such recent subjects of extended investigation as radium, asymmetric nitrogen, the proteins, and the colloid substances. It is from this fourth German edition that the French translation which is before us was prepared, and the fact that a French version is now published may be taken as in itself a tolerably satisfactory indication, not only that Ladenburg's book has established itself as a work of permanent value in the estimation of chemists irrespective of nationality, but also that it is free from national bias, such as is frequently met with in historical works. The translation bears every evidence of having had much careful attention bestowed upon it, and it gives a faithful representation of the original. The book is produced in a creditable style typographically.

(1) *Biologisches Praktikum für höhere Schulen.* By Dr. Bastian Schmid. Pp. vi+71. (Leipzig and Berlin: B. G. Teubner, 1909.) Price 2 marks.

(2) *Biologische Experimente nebst einem Anhang mikroskopische Technik.* By Walther Schurig. Pp. xi+180. (Leipzig: Quelle und Meyer, 1909.) Price 2.40 marks.

(1) THIS is an attempt to compress into seventy-one octavo pages a practical introduction to the study of the comparative anatomy of plants and animals, together with a certain amount of experimental physiology. There are seventy-five text-figures and nine plates. A considerable number of types, ranging from bacteria to mammals, are dealt with in a very scrappy and superficial manner in the text. A large proportion of the illustrations are borrowed from the works of well-known authors. They are well reproduced, but the text and explanations of the figures are very inadequate. A plate containing figures of the skeletons of a frog, a dog, and part of the skeleton of a bird (apparently there was no room for the skull, which is omitted), without a single bone labelled, is not likely to be of very much service even to the most elementary scholar. Doubtless, however, there are people who are gratified by observing a resemblance between an actual specimen and a book illustration, and they may even think that they have learnt something by comparing the two. It is only fair to the author to mention that the book is intended to be used in conjunction with the instruction of a teacher, who, no doubt, would be able to supply many of the deficiencies.

(2) This little book is addressed to school teachers and students of nature, and is intended to serve as a guide to a large number of simple experiments in animal and vegetable biology. It is very suggestive, but the style is rather too much that of a cookery book, and the work suffers greatly from over-condensation. A good practical course on general physiology, in itself a very desirable thing, might be founded upon it by an experienced and well-read teacher of biology, but it would take a very long time to carry out all the experiments in a satisfactory manner.

Inborn Errors of Metabolism. The Croonian Lectures delivered before the Royal College of Physicians of London in June, 1908. By Dr. A. E. Garrod. Pp. vi+168. (London: Henry Frowde, and Hodder and Stoughton, 1909.) Price 3*s.* 6*d.* net.

DR. GARROD delivered before the Royal College of Physicians in June, 1908, his Croonian lectures under the above title, and the present little book is a welcome re-publication of these lectures in a rather more extended form than those actually delivered. The author is well known for his researches on nutrition, metabolism, and the urine, and has always had a special bent in the unravelling of those rarer anomalies which in so many cases are transmitted from generation to generation. It would lead one too far into strictly medical matters to attempt anything in the

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